

## PENDING CLAIMS AS AMENDED

Please amend the claims as follows:

Sub B' 1. (Currently Amended) A method for pre-coding in a communication system, comprising:  
determining pre-coder parameters;  
pre-coding first data in accordance with said determined pre-coder parameters;  
transmitting said pre-coded first data; and  
transmitting non pre-coded first reference data on a common pilot signal used as a phase reference for the communication system.

Ab 2. (Original) The method as claimed in claim 1 wherein determining a pre-coder parameters comprises:  
receiving a reference data; and  
determining the pre-coder parameters in accordance with said received reference data and the reference data.

3. (Original) The method as claimed in claim 1 wherein determining a pre-coder parameters comprises:  
receiving the non pre-coded first reference data;  
determining the pre-coder parameters in accordance with said received non pre-coded first reference data and the first reference data; and  
transmitting said determined pre-coder parameters.

4. (Original) The method as claimed in claim 3 further comprising:  
receiving said determined pre-coder parameters; and  
providing said determined pre-coder parameters to the pre-coder.

5. (Original) The method as claimed in claim 1 wherein pre-coding first data in accordance with said determined parameters comprises:

pre-coding a payload data; and  
pre-coding a dedicated pilot data.

6. (Original) The method of claim 1 wherein said transmitting a non pre-coded reference data comprises:

transmitting a continuous non pre-coded reference data.

7. (Original) The method of claim 1 wherein said transmitting a non pre-coded reference data comprises:

transmitting a discontinuous non pre-coded reference data.

8. (Original) The method of claim 1 wherein said transmitting a non pre-coded reference data comprises:

transmitting a pilot data.

9. (Original) The method as claimed in claim 1, further comprising:  
receiving the non pre-coded first reference data at least two antennae;  
equalizing each of said received non pre-coded first reference data by an equalizer and provide equalized non pre-coded first reference data;

determining the pre-coder parameters by adjusting characteristics of the at least two equalizers in accordance with the received non pre-coded first reference data and the first reference data; and

transmitting said determined pre-coder parameters.

10. (Original) The method as claimed in claim 9 wherein said determining the pre-coder parameters by adjusting characteristics of the at least two equalizers in accordance with the received non pre-coded first reference data and the first reference data comprises:

optimizing a quality metric of a composite data comprising the equalized non pre-coded first reference data.

11. (Currently Amended) A method for demodulating pre-coded data in a communication system, comprising:

receiving a reference data and a pre-coded data; ~~and~~  
receiving non pre-coded reference data on a common pilot signal used as a phase reference for the communication system;

determining demodulator parameters in accordance with ~~the~~ said received reference data and ~~the~~ said received non pre-coded reference data; and

demodulating the pre-coded data in accordance with said determined demodulator parameters.

12. (Cancelled) The method as claimed in claim 11 wherein the reference data comprise a non pre-coded pilot signal.

13. (Original) The method as claimed in claim 11 wherein the reference data comprise a pre-coded pilot signal.

14. (Original) The method as claimed in claim 11 wherein the reference data are continuous reference data.

15. (Original) The method as claimed in claim 11 wherein the reference data are discontinuous reference data.

16. (Currently Amended) An apparatus for pre-coding in a communication system, comprising:

a pre-coder configured to pre-code data in accordance with pre-coder parameters; ~~and~~  
a first transmitter communicatively coupled to said pre-coder configured to:  
transmit the pre-coded data; and

transmit a non pre-coded first reference data on a common pilot signal used as a phase reference for the communication system.

17. (Original) The apparatus as claimed in claim 16, further comprising:  
a first receiver communicatively coupled to said pre-coder configured to receive a reference data;  
a first processor communicatively coupled to said first receiver; and  
a storage medium communicatively coupled to said first processor and containing a set of instructions executable by the processor to:

determine the pre-coder parameters in accordance with said received reference data and the reference data.

18. (Original) The apparatus as claimed in claim 16, further comprising:  
a second receiver configured to receive the non pre-coded first reference data;  
a second processor communicatively coupled to said second receiver;  
a storage medium communicatively coupled to said first processor and containing a set of instructions executable by the processor to:

determine the pre-coder parameters in accordance with said received non pre-coded first reference data and the non pre-coded first reference data; and

a second transmitter communicatively coupled to said second processor configured to transmitting said determined pre-coder parameters.

19. (Original) The apparatus as claimed in claim 18, wherein said first receiver is further configured to:

receive said determined pre-coder parameters; and  
provide said received pre-coder parameters to said pre-coder.

20. (Original) The apparatus as claimed in claim 16 wherein said pre-coder is further configured to pre-code a second reference data in accordance with the determined parameters; and

wherein said first transmitter is further configured to transmit the pre-coded second reference data.

21. (Original) The apparatus as claimed in claim 16 wherein said first transmitter is further configured to transmit the non pre-coded first reference data continuously.

22. (Original) The apparatus as claimed in claim 16 wherein said first transmitter is further configured to transmit the non pre-coded first reference data discontinuously.

23. (Original) The apparatus of claim 16 wherein said non pre-coded first reference data comprise a pilot data.

24. (Original) The apparatus as claimed in claim 20 wherein said first transmitter is further configured to transmit the pre-coded second reference data continuously.

25. (Original) The apparatus as claimed in claim 20 wherein said first transmitter is further configured to transmit the pre-coded second reference data discontinuously.

26. (Original) The apparatus of claim 20 wherein said pre-coded second reference data comprise a dedicated pilot data.

27. (Original) The apparatus as claimed in claim 16, further comprising:  
at least two equalizers configured to accept the received non pre-coded first reference data and provide equalized non pre-coded first reference data;  
a processor communicatively coupled to said at least two equalizers;  
a storage medium communicatively coupled to the processor and containing a set of instructions executable by the processor to determine said pre-coder parameters by adjusting characteristics of the at least two equalizers in accordance with the received non pre-coded first reference data and the first reference data; and

a second transmitter communicatively coupled to said processor configured to transmit the determined pre-coder parameters.

28. (Original) The apparatus as claimed in claim 16 wherein said processor determines said pre-coder characteristics by adjusting characteristics of the at least two equalizers in accordance with the non pre-coded first reference data the first reference data by executing a set of instructions to:

optimize a quality metric of a composite data comprising the equalized non pre-coded first reference data.

29. (Currently Amended) An apparatus for demodulating pre-coded data, comprising: a first receiver configured to:

receive a reference data and a pre-coded data; and

receive non pre-coded reference data on a common pilot signal used as a phase reference for the communication system; and

determine demodulator parameters in accordance with ~~the~~ said received reference data and ~~the~~ said non pre-coded reference data; and

a demodulator communicatively coupled to said receiver configured to demodulate the pre-coded data in accordance with said determined demodulator parameters.

30. (Cancelled) The apparatus as claimed in claim 29 wherein the reference data comprise a non pre-coded pilot signal.

31. (Original) The apparatus as claimed in claim 29 wherein the reference data comprise a pre-coded pilot signal.

32. (Original) The apparatus as claimed in claim 29 wherein the reference data are continuous reference data.

33. (Original) The apparatus as claimed in claim 29 wherein the reference data are discontinuous reference data.

34. (Currently Amended) A digital signal processing apparatus for pre-coding in a communication system, comprising:

- memory storage unit; and
- a digital signal processor communicatively coupled to said memory storage unit, and capable of executing instructions to:
  - determine pre-coder parameters;
  - pre-code first data in accordance with the determined pre-coder parameters; and
  - assist in preparing the pre-coded first data and non pre-coded first reference data for transmission, the non pre-coded reference data prepared for transmission on a common pilot signal used as a phase reference for the communication system.

35. (Currently Amended) A digital signal processing apparatus for demodulating pre-coded data in a communication system, comprising:

- memory storage unit; and
- a digital signal processor communicatively coupled to said memory storage unit, and capable of executing instructions to:
  - accept a reference data and a pre-coded data;
  - accept non pre-coded reference data from a common pilot signal used as a phase reference for the communication system;
  - determine demodulating parameters in accordance with the accepted reference data and the said non pre-coded reference data; and
  - demodulate the pre-coded data in accordance with the determined demodulating parameters.

36. (Currently Amended) An apparatus for pre-coding in a communication system, comprising:

- means for determining a pre-coder parameters;

means for pre-coding first data in accordance with said determined pre-coder parameters;  
means for transmitting said pre-coded first data and a non pre-coded first reference data,  
the non pre-coded first reference data transmitted on a common pilot signal used as a phase  
reference for the communication system.

37. (Currently Amended) An apparatus for demodulating pre-coded data, comprising:  
means for receiving a reference data and a pre-coded data; and  
means for receiving non pre-coded reference data on a common pilot signal used as a  
phase reference for the communication system;

means for determining demodulator parameters in accordance with ~~the~~ said received  
reference data and said non pre-coded reference data; and

means for demodulating the pre-coded data in accordance with said determined  
demodulator parameters.